Space Weather Forecast

Issued on Friday, 01 April 2022 at 01:29 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate-class flares likely throughout. Slight chance of further S1 or above solar radiation storms. Minor-Moderate geomagnetic storms likely on Days 1 and 2 (1st and 2nd April).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been at Moderate levels over the past 24 hours, with a Moderate X-ray flare, which originated from a sunspot region 2975 in the northwest quadrant and resulted in a minor radio blackout. The moderate flare produced a coronal mass ejection (CME) seen in available coronagraph imagery, and this may be Earth directed.
There are currently four numbered sunspots on the visible disc, of which three are large and magnetically complex, including AR2975 which has emitted isolated Moderate or Strong flares over the past two days. There are also three small and simple, yet to be numbered, regions on the visible disc.

Solar Wind / Geomagnetic Activity: Solar wind speeds started the period at slightly elevated levels. On the arrival of a coronal mass ejection (CME) at 31/0140 UTC the solar wind became elevated, and peaked at strong levels of 629 km/s at 31/1148 UTC. Towards the end of the day the solar wind speed gradually declined, ending the day at slightly elevated levels again, around 470 km/s. The strength of the magnetic field was initially weak, before quickly becoming moderate to strong on arrival of the CME. The important north-south component, was weak initially before becoming moderately negative at times during the onset of the CME, then through the afternoon and evening gradually increased to become strongly positive. Geomagnetic activity was Active to minor storm levels until the evening, then decreased to become Quiet.

Energetic Particles / Solar Radiation: The high energy proton flux (10 MeV) measured at GOES-16 showed an increase following the strong flare to reach minor storm (S1) levels for a short period around 31/0600 UTC.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be Low to Moderate, with further Moderate-class flares likely, and with a slight chance of a strong flare, most likely from region 2975 in the northwest quadrant.

Solar Wind / Geomagnetic Activity: The 28th March CME(s), arrived in the early hours of 31 March, and the resulting slightly elevated solar winds are anticipated to continue today (1 April).Tomorrow a further CME is forecast to produce a geomagnetic enhancement (2 April), probably early in the day, but confidence is currently low for the detail. A fast wind from coronal hole(s) influence is also forecast to become geoeffective tomorrow (2 April).

Active to Minor/Moderate storm periods are likely today and expected tomorrow. The CME from

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the strong flare on 30th March will probably give a glancing blow to Earth tomorrow (2nd), before gradually easing later in the day and through day 3 (3rd). However, geomagnetic activity may remain Unsettled to Active Days 3 and 4 (3rd and 4th April) due to a possible fast wind from a coronal hole(s) influence.

Energetic Particles / Solar Radiation: The continued activity of 2975 in particular gives the slight chance of further potential enhancements above the S1 threshold during the period.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	60	80	40	10
Strong	G3	No	5	20	1	1
Severe	G4	No	1	5	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	70	60
Very Active	R3 to R5 X	No	15	15	15	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	20	20	10	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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